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Abstract: The institutions for financing owner-occupied housing have not progressed as they should, and the financial innovation that has followed the financial crisis of 2007-9 has not been focused on improving the risk management of individual homeowners. This paper lists a number of barriers to housing finance innovation, and in light of these barriers, the problems of some major innovations of the past and future: self-amortizing mortgages, price-level adjusted mortgages (PLAMs), shared appreciation mortgages (SAMs), housing partnerships, and continuous workout mortgages (CWMs).

Keywords: Mortgages, securitization, Financial crises, Self-amortizing mortgages, Installment mortgages, Level-payment mortgages, Price-level-adjusted mortgages (PLAMs), Shared appreciation mortgages (SAMs), Housing partnerships, continuous workout mortgages (CWMs), Automatic workout mortgages (AWMs), Dodd-Frank Act, Continuing Care Retirement Communities (CCRCs), Consumer Financial Protection Bureau (CFPB.gov)

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Modern financial theory suggests some fundamental modifications to the institutions supporting housing, and yet nothing fundamental has happened to the standard mortgage contract between the homeowner and originator since the long-term fixed-rate self-amortizing mortgage was widely adopted in the U.S. in the 1930s, replacing the then-standard 3-5-year balloon-payment mortgage (Bartlett 1989, Green and Wachter, 2005). The U.S. mortgage industry has maintained this type of mortgage despite the mathematical finance revolution of the second half of the twentieth century, which suggests many important innovations.

I. Reasons for Slowness of Innovation in Mortgage Finance

There are quite a number of reasons why technology for homeownership has progressed more slowly than in other areas.

Experimentation with new mortgage forms is costly since it must deal directly with the broad public, creating costs of publicity, battles with regulators, and risks of lawsuits. The benefits of the experimentation are usually public goods, available to other mortgage originators, so benefits to innovators do not defray the experimentation costs. While financial patents have been awarded in the United States since the 1990s, they are weak because prior art may be impossible to ascertain until after the costly experimentation has gone on long enough to prove the value of the innovation.

Experimentation with long-term financial innovations such as mortgages may take a lifetime to prove itself completely.

Any new markets associated with the innovation will not get liquidity for such a long time, and hence may not even get started.

Mistrust by the general public of the financial community encourages the use of boilerplate mortgage contracts, virtually the same for all. The consumer thereby knows that he or she is getting the same treatment as others. This discourages mortgage contracts tailored to individual needs.

Public attention is episodic: no attention is paid to some potential rare big events until they actually happen. A tendency to think in terms of historical determinism leads people to think that exigencies of the past will not repeat themselves, and they tend even to forget about these events, rather than prepare for repeats of them. Financial crises of historic importance may spur institutional change, but only in the crisis countries, leaving observers puzzled later why some countries have an innovation and others do not.

Selection bias may compromise experimentation that would work better if the innovation were widely adopted. This is especially significant for products as important as mortgages, which attract focused attention because of their importance, and early adopters of innovative new mortgage forms may have special circumstances or exploitative motivations.

Innovators in financial institutions have no incentive to consider externalities, of course. The citizenship externality, that homeownership seems to encourage a public spirit, is well known. Externalities must also be considered in other behavioral terms. A well-designed mortgage may for example serve as a stimulus to saving, to get over the myopic tendency to postpone saving, for it puts people on a routine schedule of regular payments on principal, but mortgage originators do not profit from this benefit. The saving incentive is weakened by the lack of homeowner mortgage risk management.

The importance of mortgages as incentives to save is a relatively recent phenomenon, and hence still not part of mortgage lore. A century ago, people did not have as much incentive to save for retirement because they did not expect to live to retire, and few saved for their children's college because few even went to college. Changes like these cause changes in ideal mortgage contracts which may be difficult to motivate to the public.

Sophisticated innovations that rely on data sources, such as home price indices, cannot be implemented until the accurate indices are publicly provided, and with enough history to permit understanding the properties of the data. There is a chicken-egg problem: index providers may not have an incentive to supply them suitable for contract settlement until there are contracts that demand it, and so contracts do not have the index to get started.

Advantages that lie in the realm of behavioral economics may be poorly understood. For example, it was not until the behavioral economics revolution of the 1990s that many people fully understood that many people would benefit from a nudge to save.

II. The Widespread Adoption in the U.S. of Long-Term Self-Amortizing Mortgages

While before the 1930s some U.S. lenders, particularly building and loans, issued long-term self-amortizing mortgages, also called installment mortgages or level-payment mortgages, they were not the standard. That they were rare then may seem a mystery today, but clearly people did not see the need for any such thing until the first U.S. national housing crisis came 1925-33, and U.S. home prices fell 30% at the same time that unemployment rose from 4.9% to 23.4%.

The self-amortizing mortgage had had some unfortunate association with installment credit which proliferated for consumer durables starting in the 1880s. Jokingly called "consumptive credit," and associated with sleazy operations and door-to-door salesmen, it was criticized as abusive since it made ownership look too easy and encouraged excessive indebtedness (Calder, 1999).

Upton Sinclair's 1906 book muckraking book *The Jungle* has its protagonist Jurgis signing a contract to buy a house with a $300 down payment and 100 monthly $12 installment payments. After he unavoidably missed some monthly payments, he lost not only the house but also claim to the downpayment and all monthly payments he had already made.

It took the intervention of the government to bring long-term self-amortizing mortgages to a new standard that was respected and trusted by the public.

Before the financial crisis of the 1930s, there seemed to be no major problem with the balloon-payment.. Homeowners who missed payments could always sell the property and pocket home equity, then could rent, and there was no stigma in renting then, as most people were renters, could try again later. There was no significant national nominal home price decline in the U.S. between 1890 and 1925, and so there seemed little risk of homeowners becoming underwater (just as there was no such decline between 1950 and 2000, before the recent crisis).

III. Price-Level-Adjusted Mortgages

Under the pressure of high inflation, starting in the 1970s, the economics profession seemed to develop a consensus that hedging instruments for CPI risk should be created. Milton Friedman wrote in February 1984: "Any individual entering into a contract for a future date could hedge

himself against inflation uncertainty...” Paul Samuelson wrote that the then-new CPI-W futures contract at the Coffee Sugar and Cocoa Exchange makes “a valuable new contribution in permitting hedges against unforeseeable variability in rates of inflation.”

The price-level-adjusted mortgage (PLAM) was introduced in the early 1980s, and had some serious advocacy: Modigliani and Lessard (1984).

But both CPI futures and the PLAMS have fizzled, even though inflation uncertainty remains. The failure reflects some of the principles outlined in Section I. above.

IV. Mortgages Managing Housing Capital Risks

Shared appreciation mortgages (SAMs), which offered some risk management of home price appreciation, were offered by the Bank of Scotland and Bear Stearns in the 1990s, but acquired a damaged reputation with the boom in home prices. U.K. homeowners who took such mortgages, and lost out on the speculative gains, were so angered that they filed a class-action lawsuit against the issuers. The suit was dropped, but the reputation loss was permanent.

The housing market partnership was advocated by Andrew Caplin, Sewin Chan, Charles Freeman and Joseph Tracy (1994), which would allow homeowners to sell part of their home to investors, thereby lessening their own home price risks.

I have proposed (2008) the creation of continuous workout mortgages (CWMs), which have a preplanned workout procedure that constantly adjusts mortgage balance and payments to an index of local home prices. By tying workouts to an index, rather than the own home price, a moral hazard problem is solved.

With Rafal Wojakowski, Mark Shackleton and M. Shahid Ebrahim, we have worked out some of the pricing issues (2013a) and have done a simulation that reveals substantial welfare gain to creating autormatic workout mortgages (AWMs) (2013b).

These mortgages might be combined with housing partnerships to get part of the benefit of both: both specificity to the home’s own risks and reduced moral hazard.

There has been some questioning of the assumption that insuring homeowners against a decline in home value is a good thing. Sinai and Soulelis (2014) have written that the existing mortgage institutions may be close to optimal given that people want to live in their house forever, or move to a similar house whose price is correlated with the present house, and so are

perfectly hedged. But their paper cannot be exactly right, given the sense of distress that homeowners are experiencing who are underwater. They are more certainly not right about all homeowners, many of whom actually plan to sell their home when they retire.

There is an emerging trend in the United States and other countries, even in the emerging world, towards elderly people finishing their years in continuing care retirement communities (CCRCs). Today, 65% to 75% of U.S. CCRCs ask prospective tenants, in addition for a monthly fee, to an upfront entry fee, when they enter the facility, which allows them to guarantee that no one is evicted for running out of money. The average fee in the U.S. in 2010 was $248,000, close to the median price of an existing home (CCRC Task Force, 2010). The decline in home values with the financial crisis thus caused a CCRC vacancy crisis.

The CCRC crisis is mending itself with rising home prices, but must not be forgotten, for it reflects a fundamental problem.

V. Steps Forward

Derivative markets for owner-occupied homes, which might have facilitated the issuance of mortgage risk management contracts, at the Chicago Mercantile Exchange in 2006 and at the Chicago Board Options Exchange in 2012, and in other markets, faced numerous obstacles to success, see Fabozzi et al. (2010). Markets like these might yet catch on, supported by such innovations as the new REO-to-rental securitizations demonstrated by the Blackstone Group in late 2013.

The difficulties in making improvements in mortgage institutions have to do with the complexity of the risk management problem, coupled with mistrust of institutional players. The Consumer Financial Protection Bureau, created by the Dodd-Frank Act and having authority over mortgages, among other things, seems oriented towards addressing complaints from the public, and has focused its attention so far on such things as unfair collection practices, bias against minorities, and excessive complexity of financial products being used to confuse customers. These are laudable concerns, but complaints that economists might register about the fundamental success of mortgage products to serve risk management well have not yet taken center stage.

There is an important role for government support of research as a public good that improves our understanding of the basic risk management problem that people face in their housing tenure decisions. Alternative forms of mortgage need to be studied on a scientific basis. The New Development economics, Karlan and Appel (2011), Bannerjee and Duflo (2012) has shown how carefully controlled experiments can reveal solid steps to take regarding new financial institutions for poverty reduction. The same methods could be used to improve mortgage institutions, as well as rental, leasing, partnership and cooperative institutions, in advanced countries.

It is important to subsidize applied research in behavioral economics, on perceptions of risk and on myopia concerning risks, relevant to understanding why the public does not demand better risk management with their mortgages.

Governments should also subsidize research on measuring risk factors relevant to housing tenure, possibly using procedures such as hedonic repeated-measure home price indices (Shiller 1993) for quality and narrow geographical subsets of the market, and consistently-formulated international home price indices.

Governments also should subsidize fee-only financial advisers for everyone, so that they can get mortgage advice from other than just salespeople with vested interests.

We need also to explore how to promote better use of our blossoming information technology, which makes possible vastly more complexity while retaining user friendliness.

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